REMARKS

I. The Status of Claims.

Claims 1-32 were originally presented for examination before the United States Patent and Trademark Office (the "Office") with filing of a patent application on July 7, 2001. The first Office Action provides the following: objection to Claims 13, 21, and 24 because of informalities; rejection of Claims 1m 3-13 and 16 under 35 U.S.C. § 102(b) as being anticipated by Burke, Jr. (US No. 3,688,570); rejection of Claims 4 and 9 under 35 U.S.C. §103(a) as being unpatentable over Cui et al (US No. 6,115,111); rejection of Claims 17-19 and 24-32 under 35 U.S.C. §103(a) as being unpatentable over Burke, Jr in view of Bechtel et al (US 5,001.937, cited by applicants);. rejection of Claims 2, 14 and 15 under 35 U.S.C. §103(a) as being unpatentable over Burke, Jr in view of Cui et al (US 6,399.940 B1); and rejection of claims 20-23 under U.S.C. §103(a) as being unpatentable over Burke, Jr as modified by Bechtel et al further in view of Cui et al.

Applicant has cancelled claims 2, 14 and 20 and amended claims 1, 6 11, 13, 17, 21, 24-25 and 28 Claims 1, 3-`13, 15-19, and 21-32 remain pending in the present application. Applicant now respectfully requests reconsideration of his application.

II. Objection to Claims 13, 21 and 24.

Claims 13, 21 and 24 were objected to because of specific informalities identified by the Examiner. Claim 13 has been amended to properly depend from claim 11. Claim 21 has been amended to property depend from claim 20. Claim 24, at lines 7 and 9, has been amended to correct the lack of antecedents for "said bar code" recited therein.

Applicant believe claims 13, 21 and 24 are now in proper form for examination and reconsideration by the Office.

III. Rejection of Claims 1, 3-13 and 16 as being anticipated by Burke Jr.

Claims 1, 3-13 and 16 currently stand rejected by the Office under 35 U.S.C. §102(b) as being anticipated by Burke Jr. Claims 1 and 11 have been amended. The rejection of claims 1, 3-13 and 16 is now respectfully traversed.

Burke does not teach a method for analyzing the performance of a mechanical system that includes the steps of: directing light from at least one Vertical Cavity Surface-Emitting Laser (VCSEL) to encoded portions of two rotating members associated with said mechanical system; reflecting a portion of said light to at least one encoded portion of said rotating members; detecting a reflected portion of said light; and recovering information from the reflected portion of light, information that can include performance characteristic data of the mechanical system.

As indicated by in Burke Jr and by the Examiner, the Burke Jr patent does not teach the use of lasers, let alone Vertical Cavity Surface-Emitting Laser (VCSEL). Burke merely utilizes a lamp, which is not conducive for use in small-scaled environments or with as much lighting efficiency as a collimated laser such as a VCSEL. By not teaching laser use, Burke Jr fails to teach each and every element of the invention as provided by Applicant in claim 1. Claims 3-12 depend from claim 1 and claims 12-13 and 16 depend from Claim 11. For these reasons, the rejection is respectfully traversed.

IV. Rejection of Claims 17-19 and 24-32 as being unpatentable over Burke Jr in view of Bechtel et al.

Claim 17-18 and 24-32 currently stand rejected by the Office under 35 U.S.C. §103(a) as being unpatentable over Burke Jr in view of Bechtel et al, which is a reference cited by the Applicant. Claims 17 and 24 have been amended. The rejection is now respectfully traversed.

With regard to claims 17-19, independent claim 17 provides a system that can detect the relative motion between two rotating members in a mechanical system. Burke teaches a system for detecting motion of two rotating members as well, but not a system configured like Applicant's invention. Applicant

provides a system that includes two identical lasers for generating two identical light beams. Burke does not teach use of lasers. Bechtel does teach use of one laser, but not for the measurement of more than one moving member for eventual comparison of rotating patterns formed thereon. The Examiner states on page 7 of the Official Action that "Bechtel et al teaches an apparatus for detecting the relative motion between two rotating members (bands 2 and 3) in a mechanical system; however, the Bechtel et al patents only describes bands 2 and 3 as being associated with a (singular) rotating shaft. Bands 2 and 3 are stationary patterns. Applicant actually provides his patterns on two physical members that are distinct (e.g., separate disks with pattern markings). Applicants configuration has shown to be effective for measuring torsion along a rotating bar (e.g., torsion bar 306).

Burke does not teach the use of more than one light (see Fig. 4) for carrying out their measurements. There is clearly no need for more than one light source according to the specification provided by Burke Jr. One skilled in the art would not be motivated to combine the teaching of Burke and Bechtel to arrive at a system that uses two identical lasers, each for illuminating a reflector associated with each of two rotating members. One this distinction alone, the combination of Burke and Bechtel fails to render Applicant's claim 17, as amended, obvious. But there are other distinctions that further distance Burke and Bechtel from Applicant's invention.

Applicant teaches the use of one detector to detect Moirè fringes formed as a result of the interaction of reflected images from the first and second encoded portions of said first and second rotating members. The detector is located proximate to the mechanical system to receive the two reflected images associated with each member. Bechtel does not utilize or require the use of more than one detector either, but for a different reason. Bechtel does not use more than one light source and one associated reflection. Applicant's detector, however, receives two separate signals to detect Moirè fringes. Bechtel is not looking for Moirè fringes. Burke, however, is looking for Moirè fringes, but utilizes two detectors and one light source (not a laser), which is an opposite

configuration from Applicant's claimed invention. For these reasons, the rejection of claims 17-19 and 24-32 is respectfully traversed.

V. Rejection of Claims 17-19 and 24-32 as being unpatentable over Burke Jr in view of Bechtel et al.

Claim 17-18 and 24-32 currently stand rejected by the Office under 35 U.S.C. §103(a) as being unpatentable over Burke Jr in view of Bechtel et al, which is a reference cited by the Applicant. Claims 17 and 24 have been amended. The rejection is now respectfully traversed.

With regard to claims 17-19, independent claim 17 provides a system that can detecting the relative motion between two rotating members in a mechanical system. Burke teaches such a system as well, but not a system configured like Applicant's invention. Applicant provides a system that includes two identical lasers for generating two identical light beams. Burke does not teach use of lasers. Bechtel does teach use of one laser, but not for the measurement of more than one moving member, therefore Bechtel would not benefit from the use of more than one laser. Furthermore, Burke does not teach the use of more than one light (see Fig. 4) for its measurements. One skilled in the art would not be motivated to combine the teaching of Burke and Bechtel to arrive at a system that uses two identical lasers, each for illuminating a reflector associated with each of two rotating members. One this distinction alone, the combination of Burke and Bechtel fails to render Applicant's claim 17, as amended, obvious. But there are other distinction that further distance Burke and Bechtel from Applicant's invention.

Applicant teaches the use of one detector to detect Moirè fringes formed as a result of the interaction of reflected images from the first and second encoded portions of said first and second rotating members. The detector is located proximate to the mechanical system to receive the two reflected images associated with each member. Bechtel does not utilize or require the use of more than one detector either, but for a different reason. Bechtel does not use more than one light source and one associated reflection. Applicant's detector,

however, receives two separate signals to detect Moirè fringes. Bechtel is not looking for Moirè fringes. Burke, however, is looking for Moirè fringes, but utilizes two detectors and one light source (not a laser), which is an opposite configuration from Applicant's claimed invention. For these reasons, the rejection of claims 17-19 and 24-32 is respectfully traversed.

VI. Rejection of Claims 2, 14 and 15 as being unpatentable over Burke Jr in view of Cui et al.

Claim 2, 14 and 15 currently stand rejected by the Office under 35 U.S.C. §103(a) as being unpatentable over Burke Jr in view of Cui et al, which teaches the use of a VCSEL in association with a precise positioning system (position encoder). Claims 2 and 14 have been cancelled, their contents being directed to VCSELs and now being provided as an element in their respective independent claims, 1 and 11. Claim 15 remains in its original form, also providing use of VCSEL technology as its essence. The rejection of claim 15 is respectfully traversed.

Vertical Cavity Surface Emitting Laser (VCSEL) technology is an important feature of Applicant's invention, as discussed throughout the specification and now provided as an element within independent claims 1 and 11. Incorporation of VCSEL technology enhances the overall performance, signature and operation of Applicant's system.

Cui et al does not teach the benefits of utilizing VCSEL technology for the detection of Moirè fringes in their system. Cui et al, like Bechtel et al, does not teach systems or methods for sensing relative torque using Moirè fringes generated utilizing a VCSEL Therefore, the rejection of claim 15 is respectfully traversed.

VII. Rejection of Claims 2, 14 and 15 as being unpatentable over Burke Jar in view of Cui et al.

Claim 2, 14 and 15 currently stand rejected by the Office under 35 U.S.C. §103(a) as being unpatentable over Burke Jr in view of Cui et al, which teaches the use of a VCSEL in association with a precise positioning system (position encoder).

Claims 2 and 14 have been cancelled, their contents being directed to VCSELs and now being provided as a element in their respective independent claims, 1 and 11. Claim 15 remains in its original form, also providing use of VCSEL technology as its essence. The rejection of claim 15 is respectfully traversed.

Vertical Cavity Surface Emitting Laser (VCSEL) technology is an important feature of Applicant's invention, as discussed throughout the specification and now provided as an element within independent claims 1 and 11. Incorporation of VCSEL technology enhances the overall performance, signature and operation of Applicant's system. Applicant provides benefit where two VCSELs are used.

Cui et al does not teach the benefits of utilizing VCSEL technology for the detection of Moirè fringes in their system. Neither Burke Jr, Bechtel et al or Cui et al, alone or in combination teach the use of two VCSELs to reflect off of two separate patterns borne by two rotating members associated with a torsion bar. Applicant, in contrast to Burke Jr. and Bechtel et al, describes a system and method for sensing relative torque using Moirè fringes generated utilizing at least one, compared to discussions in the cited art. Therefore, the rejection of claim 15 is respectfully traversed.

VIII. Rejection of Claims 20 and 21 as being unpatentable over Burke Jr as modified b Bechtel et al, further in view of Cui et al.

Claim 20-23 stand rejected by the Office under 35 U.S.C. §103(a) as being unpatentable over Burke Jr as modified by Bechtel et al and further in view of Cui et al, which teaches the use of a VCSEL in association with a precise positioning system (position encoder). Claim 20 has been cancelled. Claims, 21 and 22 now depend on Claim 17 for which comments have already been provided above.

Use of at least two Vertical Cavity Surface Emitting Lasers (VCSEL) is an important feature of Applicant's invention, as discussed throughout the specification and now provided as an element within independent claims 1 and 11. Incorporation of VCSEL technology in the form provided by Applicant enhances the overall performance, signature and operation of his system through means not

obviated by Burke Jr, Bechtel et al and Cui et al, regardless of the manner in which these references are combined..

Cui et al does not teach the benefits of utilizing at least two VCSELs for the detection of Moirè fringes. Rejection of claim 21 is respectfully traversed.

IX. Conclusion

Applicants have responded to each and every objection and rejection of the Official Action, and respectfully request that a timely Notice of Allowance be issued. Applicants respectfully submit that the foregoing discussion does not present new issues for consideration and that no new search is necessitated. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objections and the rejections and request timely issuance of the present application.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned representative to conduct an interview in an effort to expedite prosecution in connection with the present application.

Respectfully submitted for,

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